

or less, when practicable. This is effected by a correct adjustment of the size and shape of the sewer to its fall, having assumed the total amount of sewage that is to be provided for daily. The question is one of hydraulics, and may be solved by the use of well known formulæ for the flow of water in channels.

EXAMPLE.—As an illustration, take the following, from “Rawlinson’s Suggestions”: “The sewage of a town or village will consist of waste-water and excreta from the houses, and the volume, in round figures, may range from 100 to 250 gallons per day from each house. This volume will probably flow off in about eight hours, so that the sewers must provide for not less than three times this volume, if even every drop of roof and surface-water can be excluded. It is more usual to assume that one-half the daily quantity is discharged in from 6 to 8 hours. As this cannot in all cases be accomplished, the sewers should provide for not less than 1,000 gallons from each house; or for a town of 1,000 houses (5,500 population) have a delivering capacity of about 1,000,000 gallons (daily). An outlet sewer of 2 feet diameter, laid with a fall of 5 feet per mile, will deliver upwards of 2,000,000 gallons, flowing a little more than half full. Lesser diameters will answer where there are greater falls.”

A 2-feet sewer thus provides for doubling the population in a few years.

Now 100 to 250 gallons per day, from each house, containing $5\frac{1}{2}$ persons, corresponds to from 18.2 to 45.5 gallons per day for each person, which figures represent about the extremes in English practice; 30 gallons being the usual allowance, excluding rain-water.

In the case above, the velocity of the sewage of 11,000 persons is about 2 feet per second, which is the minimum velocity in order that so small a sewer may be *self-cleansing*.

As the velocity is less for the real population of 5,500, especially if they use less water than 1,000,000 gallons, the inclination of the sewer should be increased if possible, or “flushing” will have to be resorted to, or the sewer must be made smaller than the 2-feet diameter, to secure the proper velocity to make